

# UNISEC-Japan Regional Report 2019

**Mengu Cho, Kyushu Institute of Technology**  
**Board member of UNISEC-Japan**

# Outline

- Overview of UNISEC-Japan
- Activities of 2019
- Capacity building activities by Japanese universities

# Overview of UNISEC-Japan

- UNISEC: “University Space Engineering Consortium”
  - UNISON: UNISEC Student Organization
  - UNISAS: UNISEC Alumni Organization
- Established in 2002
- NPO/NGO to facilitate/promote university level students’ practical space development activities, such as designing, manufacturing and launching small satellites and hybrid rockets.
- 74 laboratories/groups from 53 universities
- 823 student members, 267 individual supporters, and 14 corporate supporters
- 3 pillars: Human resource development, Technological development, Outreach



# Activities in 2019

- March 13: Takumi Conference
- Aug.19-Aug.30 : CLTP10 (CanSat Leader Training Program.)
- July 28: General assembly
- August 15-23: Noshiro space event (CanSat, Rocket)
- September 9-12: ARLISS (A locket launch for international student satellites) – CanSat
- December 1-2: Annual Workshop

# Student activities



Rocket

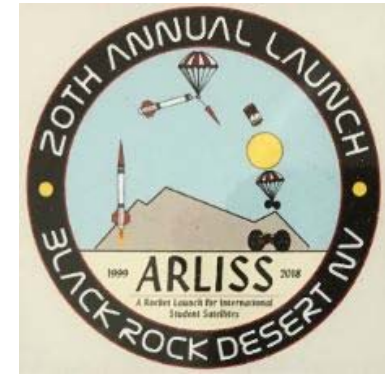


CANSAT

Credit:大阪府立大学

# CanSat / ARLISS (A Rocket Launch for International Student Satellites)

- ARLISS, a CanSat launch event has been held at Black Rock Desert, NV, USA since 1999.  
**(20<sup>th</sup> Anniversary in 2018)**
- Every year, over 100 students participate in ARLISS.



2019 WINNER  
They accomplished twice  
perfect goals!!



# University satellites launched this year



Credit: JAXA

RISESAT (Tohoku U.)

Micro-Dragon (Keio U.)

OrigamiSat-1 (Tokyotech)

RISESAT (Tohoku U.)

AOBA VELOX-IV (Kyutech)

NEXUS-1 (Nihon U.)



Credit: JAXA

BIRDS-III x 3 (Kyutech)

AQT-D (Tokyo U.)

10 satellites (4x1U, 1x2U, 2x3U, 3x50kg) went to orbit this year

# Capacity Building Activities

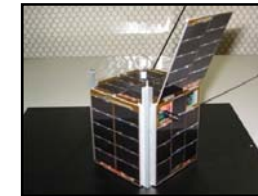


# Matunaga Lab, Tokyo Tech

2003.6

World 1st CubeSat, **CUTE-I** Launched by **Rockot**

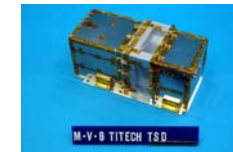
- Acquisition of satellite bus technologies
- It is working for **16 years** !



CUTE-I, 1kg, 10\*10\*10

2005.7

Separation System **TSD** Launched by **M-V-6**

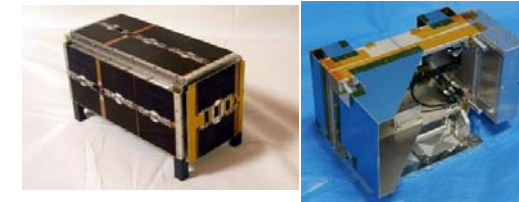


TSD

2006.2

2nd, **Cute-1.7+APD** Launched by **M-V-8**

- Bus and Mission design methodology
- It was operated for about a month



Cute-1.7+APD, 10\*10\*20

2008.4

3rd, **Cute-1.7+APD II** Launched by **PSLV-C9**

- APD sensor measured low-energy particles in all-sky
- It is working for **11 years** !

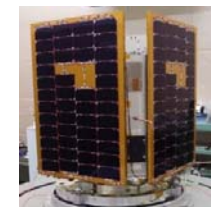


Cute-1.7+APD II, 10\*15\*20

2014.11

4th, 50kg **TSUBAME** Launched by **Dnepr**

- Polarized  $\gamma$ -ray burst observation using CMGs



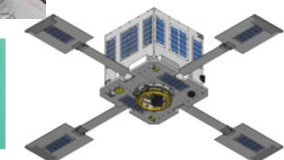
TSUBAME  
50\*50\*50

2019.1

**DLAS** Deep Learning Attitude Sensor Launched by **Epsilon 4**

2018 -

5th, 40kg-class **Hibari** is now under developed



◆ **HEPTA-Sat Space Systems Engineering Program started since 2012**

- **Purpose:** Contribute to capacity building in space technology.
- **Product:** Training package(Instructor, Kit, Textbook) and Training



◆ **Annual Training Program for Instructor**

- CLTP8(2017)~CLTP10(2019) in Japan

◆ **International Space University**

- SHSSP(2019,2020), SSP(2019)

◆ **University Training and Curriculum**

- UAE University, Sofia University, etc.

◆ **Workshop collaboration with UNOOSA**

- International workshop in South Africa(2017)



**Training Package**



**Training**



Host countries

● 9

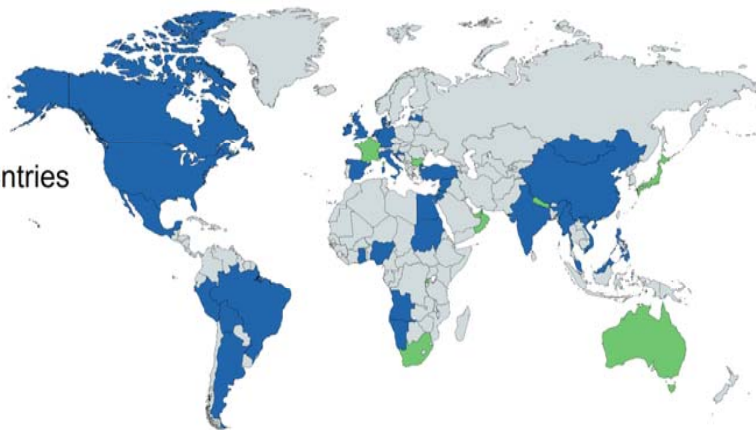
Participating countries

● 53

Trainees

324

During 2017.10~2019.11



**Participants distribution since Oct.10 2017**



**SHSSP(International Space University)**

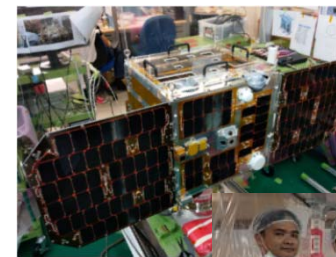


# Hokkaido University / Tohoku University

- New micro-satellite projects and education opportunities are being offered in **Asian Micro-satellite Consortium**
  - organized by Hokkaido University and Tohoku University
  - total 13 students from **Philippines**, 12 from **Vietnam**, 4 from **Myanmar**, 2 from **Mongolia**, and 2 from **Indonesia**
  - New projects with **Myanmar** and **Malaysia** have started in 2019
- **Two Micro-satellites and One ground station for Philippines** have been jointly developed and being operated
  - **DIWATA-1** (52kg, ISS release, 2016), **DIWATA-2** (57kg, SSO, 2018)
  - Alumni contribute to **Philippine Space Agency (PhilSA)** newly established in 2019
- Development and flight operations of micro satellites and cubesats
  - assembled and launched **7 micro satellites and 3 cubesats** until 2019
  - **5 active ground stations** with partner organizations
  - **remote sensing and engineering demonstration**
  - design, assemble, test, flight operation, and flight data analysis



AMC members  
(9 countries and 16 organizations)



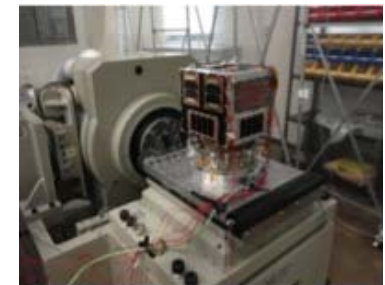
DIWATA-2 project



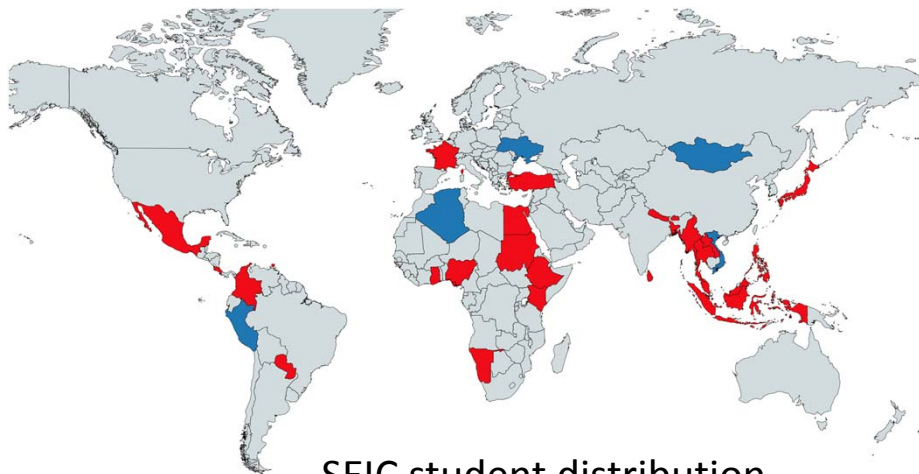
ground stations (5 active)

# **Kyutech** Kyushu Institute of Technology

- Post-graduate academic program offered in English since 2013
  - Space Engineering International Course (SEIC)
    - 96 foreign students from 31 countries
    - Tied with United Nation Long-Term Fellowship Program (PNST)
- CubeSat program (BIRDS project)
  - Bangladesh, Mongolia, Ghana, Bhutan, Nigeria, Philippine, Malaysia, Sri Lanka, Nepal, Paraguay
- Satellite testing and short-term training
  - Singapore, Philippine, Vietnam, Malaysia, Thailand, Finland, Egypt , UAE, South Korea, Sudan, Mongolia
- Consultation and launch coordination
  - Costa Rica, Egypt, Philippine



Satellite testing



SEIC student distribution



BIRDS project

# Conclusion

- Since 2002, UNISEC has been successful to provide valuable engineering talents to Japanese society
- Supported by individual, corporations, government, agency
  - But most of all, students
- Japanese universities are engaged in various capacity building activities